Grid Planning & Development - Target 57/30

Contract #: 100-98-001 **Project #:** 13
Contractor: Electric Power Research Institute (EPRI)
Subcontractors: California Institute of Technology : Canadian Electricity Association : Carnegie Mellon University : Cornell University : ESEERCO : Harvard University : Honeywell, Inc. : Howard University : Iowa State University : Michigan Technological University : Mississippi State University : New Mexico State University : P Plus Corporation : Power Technologies, Inc. : PSERC : Purdue Research Foundation : Southern Company Services, Inc. : Texas Engineering Experiment Station : University of Washington
Project Amount: $360,000
Match Amount: $4,489,860
Contractor Project Manager: Dan Sobajic (650) 855-8537
Commission Contract Manager: Don Kondoleon (916) 654-3918
Status: Completed

Project Description:
The purpose of this project is to help grid planners have ample lead-time to prepare for the occasional bulk power transfer. Presently, they are responsible for facilitating hundreds of electricity sales and purchases each day. Bids must be processed in near real time and congestion issues must be resolved on the fly. Grid planning is becoming increasingly complex and labor intensive. This situation is directly at odds with dwindling work forces and loss of experienced personnel and the public demand for lower cost energy. To address this situation, EPRI is providing advanced analysis tools and enhanced communication systems. EPRI's Grid Planning and Development program provides a comprehensive portfolio of technology solutions for coping with the short-, mid-, and long-term planning and design demands of a changing industry. While the industry continues to change, the need to deliver reliable economical power will not. This target delivers planning aids and operator-training tools that improve grid utilization, reduce operating costs, and ensure system security.

This project supports the PIER Program objectives of:

- Improving the reliability/quality of California's electricity by developing advanced analysis tools and enhanced communication systems which will enhance grid planning in today's high transaction environment while maintaining system security.
- Improving the energy cost/value of California's electricity by improving grid utilization and reducing operating costs through the development and application of advanced tools and communications systems.

Proposed Outcome:

1. Provide software, methods, and information to increase the reliability of the California transmission grid.

Actual Outcome:

1. Software, methods, and information to increase grid reliability.
    - Information was provided that will assist the CA-ISO and California energy companies in designing rates and measuring ancillary services. Detailed information was provided on measuring three ancillary services—regulation, load following, and black start—and on certification testing for black start.
    - Versions 5.0 and 5.1 were released of EPRI's Transmission Reliability Evaluation for Large-Scale Systems (TRELSS) Program, which allows grid planners to

simulate outages and study their effect on system reliability after taking suitable corrective action.

- Version 1.2 was released of Composite Reliability Assessment by Monte Carlo (CREAM), which simulates the composite effects of generation and transmission outages.
- Two software programs were released, and two reports were published on, simulation of complex systems, including a report on prototype intelligent software agents for trading electricity.
- A methodology was produced for evaluating short-term risk in power system planning in the presence of load forecast and fuel price uncertainty.
- Tools were developed to evaluate the annual production cost of electricity as a function of uncertainty in generator availability.
- Version 5.2 was released of EPRI's Small Signal Stability Program (SSSP), which identifies the causes of power system instability and pinpoints the location of technologies to mitigate the problems.
- Version 5.2 was released of EPRI's Voltage Stability Program (VSTAB), which determines areas that are prone to voltage instability.
- Version 5.2 was released of EPRI's Dynamic Reduction Program (DYNRED), which reduces large power system models to lower-order models that retain the characteristics of the original models while significantly reducing the computer time required to perform studies.
- The Common Information Model (CIM) was extended to planning applications, enabling planners to base their studies on operating data and to more closely cooperate with CA-ISO operators.
- Version 5.2 was released of EPRI's Extended Transient Mid-term Stability Program (ETMSP), which allows CA-ISO to conduct mid-term simulations for nonlinear stability analysis of the power system.
- The Off-Line Transfer Capability Evaluation (TRACE) software program was released, and a training workshop was held. This program will allow CA-ISO to increase transmission service revenues by accurately determining the maximum available transfer capability.
- A tri-annual newsletter was published on new software programs and methods for improved transmission grid operation.
- A workshop was held for regional transmission organizations (RTOs) and independent system operators (ISOs), and proceedings of the workshop were published.

Project Status:
The Commission's participation in this target ended December 31, 2000.